



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,131	02/27/2004	Tisna Tjiptahardja	Q79967	4664
23373	7590	11/23/2005		
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER COLLINS, TIMOTHY D	
			ART UNIT	PAPER NUMBER
			3643	

DATE MAILED: 11/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/787,131

Applicant(s)

TJIPTAHARDJA ET AL.

Examiner

Timothy D. Collins

Art Unit

3643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 4-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings were received on 8/4/05. These drawings are accepted.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 7-14 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 7-14 and 16, it is unclear if the applicant intends to claim 1 branch or 4 branches of the heat exchange fluid circulation path. For instance in the claim it calls for a branch that is connected to the outlet of the evaporator that is connected to multiple sides, however this could be one branch with only one evaporator connected to all the sides, or it could be individual branches each with separate evaporators which are individually connected to one side each. It is therefore unclear what exactly the applicant wishes to claim. It is still unclear from the language of the claims exactly what the applicant is looking to provide coverage for. The claims could read on a single heat pipe which connects through all the radiators or a heat pipe which goes from an evaporator to a radiator at each side. In other words it could be a serial or parallel style of connection. Because of the above the claims have been treated as best understood. It is suggested that the applicant clearly state exactly

what is required in the claims, not just in the arguments which do not distinguish claims over the prior art.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 7,9,11,13,15-17 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 6478258 to Yee (hereinafter called 258).

a. Re claims 7 and 11, 258 discloses the use of loop heat pipes 11 (heat transfer means) connected to the internally located equipment panels 12 and to the externally located radiator panels 13 which may be on all the sides of the satellite, all as seen in column 2 at lines 15-18,31-34, and 36-59. 258 also discloses at least one shelf in that the equipment panels 12 are “shelves” because they hold the equipment that is generating heat which must be dissipated. 258 discloses at least one capillary pumped two phase fluid loop inherently because the loop heat pipes use capillary action to wick the liquid to the hot side and then the heat vaporizes the liquid into a gas which then flows to the cold side where it is condensed back into a liquid. This gas to liquid shift is a phase change, because the gas and liquid are each phases of the coolant or heat exchange fluid material. Therefore this is a two phase fluid loop. 258

discloses that the loop comprises at least one evaporator 14 which is located near the electronic heat producing equipment which is on the shelf 12, the evaporator inherently having an inlet and an outlet for the heat exchange fluid. Also 258 discloses that the evaporator is thermally connected to the equipment supported by the shelf in that it states that the equipment is mounted on the panels and the heat pipes are routed from the panels to the radiator panels, seen at least in column 1 at lines 29-35 and also in column 2 at lines 15-18. Also it is seen that the evaporator 14 is where the heat is collected and then moved to the condenser 15 which is where the heat is radiated off of the craft, as seen in column 2 at lines 36-40. Also 258 discloses that there is an evaporator which is coupled to a shelf with a loop running to a side with the condensers being at the radiator on the side of the craft as seen at least in figure 1. Also as seen in the specification any of the sides may be used as radiator locations.

b. Re claim 9, 258 discloses that the sides are North, South, east/west/Earth/anti-Earth faces and that they have radiator panels as seen in the figures and in column 2 at lines 31-33.

a. Re claim 13, as seen in at least figures 1 and 2, there are a plurality of shelves for supporting equipment and a fluid loop for each shelf.

b. Re claims 15-17, see rejection of claims 7,11, and 9 above.

c. Re claim 20, see rejection of claims 7,11 and 9 above.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6478258 to Yee (hereinafter called 258) in view of applicant's admission from pages 2 and 3 of the specification that heat pipes are known to be used in geostationary communication satellites with the North, South, east/west/Earth/anti-Earth faces being used for heat dissipation for the electronics with the heat pipes.

d. Re claim 1, 258 discloses the use of loop heat pipes 11 (heat transfer means) connected to the internally located equipment panels 12 and to the externally located radiator panels 13 which may be on all the sides of the satellite, all as seen in column 2 at lines 15-18,31-34, and 36-59. 258 also discloses at least one shelf in that the equipment panels 12 are "shelves" because they hold the equipment that is generating heat which must be dissipated. However 258 may not specifically disclose that the satellite is a communications satellite in a geostationary orbit, but the applicant's admission teaches of these known satellites. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the teachings of these known satellites into the device of 258 so as to allow for the

efficient cooling of the electronics of the satellite as taught by 258. 258 discloses at least one capillary pumped two phase fluid loop inherently because the loop heat pipes use capillary action to wick the liquid to the hot side and then the heat vaporizes the liquid into a gas which then flows to the cold side where it is condensed back into a liquid. This gas to liquid shift is a phase change, because the gas and liquid are each phases of the coolant or heat exchange fluid material. Therefore this is a two phase fluid loop. 258 discloses that the loop comprises at least one evaporator 14 which is located near the electronic heat producing equipment which is on the shelf 12, the evaporator inherently having an inlet and an outlet for the heat exchange fluid. Also 258 discloses that the evaporator is thermally connected to the equipment supported by the shelf in that it states that the equipment is mounted on the panels and the heat pipes are routed from the panels to the radiator panels, seen at least in column 1 at lines 29-35 and also in column 2 at lines 15-18. Also it is seen that the evaporator 14 is where the heat is collected and then moved to the condenser 15 which is where the heat is radiated off of the craft, as seen in column 2 at lines 36-40. Also 258 discloses that there is an evaporator which is coupled to a shelf with a loop running to a side with the condensers being at the radiator on the side of the craft as seen at least in figure 1. Also as seen in the specification any of the sides may be used as radiator locations.

e. Re claim 6, as seen in at least figures 1 and 2, there are a plurality of shelves for supporting equipment and a fluid loop for each shelf.

Art Unit: 3643

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over 258 as applied to claims 1 and 6 above, and further in view of USPN 4899810 to Fredley (hereinafter called 810).

f. Re claim 4, 258 as modified above may not specifically disclose that there is an isolator at the outlet of the condenser to block uncondensed vapor, however 810 teaches of this at least in column 3 at lines 5-13. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the teachings of isolators into the device of 258 as modified so as to keep vapor out of the wick and keep the system from being deprimed as taught by 810, while making it work more efficiently.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over 258 as applied to claims 1 and 6 above, and further in view of USPN 5806803 to Watts (hereinafter called 803).

g. Re claim 5, 258 as modified above may not specifically disclose that there is a shelf that is parallel to the face of the structure facing Earth, however 803 teaches of this at least in figures 1 and 2, it can be seen that the Earth face is the face that is "up" in the figures and number 36 is a shelf which is parallel and made to carry equipment. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the teachings of parallel shelves to the Earth face into the device of 258 as modified so as to use the space more efficiently and make shelves where-ever they will fit to pack in large amounts of electronics. This would allow for a greater load in the



satellite and provide a great cost savings by not having to launch as many satellites. Also this is an obvious matter of design choice because the applicant has not disclosed that a shelf parallel to the Earth face solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the shelves in any configuration such as those of the 258 reference.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over 258 as applied to claims 7,9,11,13,15-17 and 20 in the 102 rejection above. 258 does not specifically state that the loop has a plurality of evaporators. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used multiple evaporators, since it has been held that mere duplication of essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. V. Bemis Co.*, 193 USPQ 8. This would be done for the purpose of moving more heat and also redundancy and backup systems for assured operation of the cooling systems.

11. Claims 10 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over 258 as applied to claims 7,9,11,13,15-17 and 20 in the 102 rejection above, and further in view of USPN 4899810 to Fredley (hereinafter called 810).

h. Re claims 10 and 18, 258 as modified above may not specifically disclose that there is an isolator at the outlet of the condenser to block uncondensed vapor, however 810 teaches of this at least in column 3 at lines 5-13. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the teachings of isolators into the device of

Art Unit: 3643

258 as modified so as to keep vapor out of the wick and keep the system from being deprimed as taught by 810, while making it work more efficiently.

12. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over 258 as applied to claims 7,9,11,13,15-17 and 20 in the 102 rejection above, and further in view of USPN 5806803 to Watts (hereinafter called 803).

13. Re claim 12, 258 as modified above may not specifically disclose that there is a shelf that is parallel to the face of the structure facing Earth, however 803 teaches of this at least in figures 1 and 2, it can be seen that the Earth face is the face that is "up" in the figures and number 36 is a shelf which is parallel and made to carry equipment. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the teachings of parallel shelves to the Earth face into the device of 258 as modified so as to use the space more efficiently and make shelves where-ever they will fit to pack in large amounts of electronics. This would allow for a greater load in the satellite and provide a great cost savings by not having to launch as many satellites. Also this is an obvious matter of design choice because the applicant has not disclosed that a shelf parallel to the Earth face solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the shelves in any configuration such as those of the 258 reference.

14. Claims 14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over 258 as applied to claims 7,9,11,13,15-17 and 20 in the 102 rejection above, and further in view of applicant's admission from pages 2 and 3 of the specification that heat pipes are known to be used in geostationary communication satellites with the North,

Art Unit: 3643

South, east/west/Earth/anti-Earth faces being used for heat dissipation for the electronics with the heat pipes.

***Response to Arguments***

15. Applicant's arguments filed 8/4/05 have been fully considered but they are not persuasive.

c. Re applicant's argument that the reference Yee fails to teach of multiple fluid branches. The examiner maintains that this is clearly seen in that the reference shows a branch going from evaporators on shelves to condensers on sides. The spec also discloses this in column 1 at lines 54-57, column 2 at lines 31-33, 36-39 and lines 56-59.

d. Re applicant's argument with respect to the rejection of claims 1-3 and 6, that the art does not disclose "multiple branches routed to various radiator panels, with each branch having a condenser and each branch connected to the same evaporator or evaporators as claimed". The examiner maintains that in column 1 at lines 54-57, column 2 at lines 31-33, 36-39 and lines 56-59, and more specifically in the last cited section of lines 56-59 this is clearly stated.

e. Since all of the applicant's arguments hinge on those with respect to the first set of claims and specifically claim 1, the examiner has pointed out the deficiency of all of the applicant's arguments in this response.

f. It is also noted that the applicant has not argued the examiner's use of the applicant's admission of prior art and therefore the examiner takes this as the

Art Unit: 3643

applicant's agreement that "heat pipes are known to be used in geostationary communication satellites with the North, South, east/west/Earth/anti-Earth faces being used for heat dissipation for the electronics with the heat pipes". Also the examiner notes that the applicant must also agree with the examiner's combinations since the validity of these were not called into question.

***Conclusion***

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

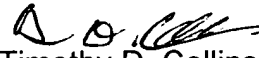
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

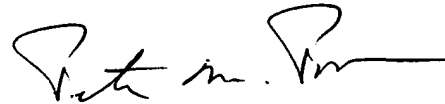
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy D. Collins whose telephone number is 571-272-6886. The examiner can normally be reached on M-F, 7:00-3:00, with every other Fri. off.

Art Unit: 3643

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter M. Poon can be reached on 571-272-6891. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Timothy D. Collins  
Patent Examiner  
Art Unit 3643

  
Peter M. Poon  
Supervisory Patent Examiner  
Technology Center 3600

11/14/05